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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,963	10/15/2003	Mikhail A. Gutin	02026	8830

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EXAMINER

DOAN, JENNIFER

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/686,963

Applicant(s)

GUTIN ET AL.

Examiner

Jennifer Doan

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-13 is/are rejected.
- 7) ☒ Claim(s) 7 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>101503</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The prior art documents submitted by applicant in the Information Disclosure Statement filed on 10/15/2003, have all been considered and made of record (note the attached copy of form PTO-1449).

Drawings

2. The drawings, filed on 10/15/2003, are accepted.

Specification

3. Applicants' cooperation is requested in correcting any errors of which applicants may become aware in the specification.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner (U.S. Patent 4,474,424) in view of Zhang et al. (U.S. Patent 6,108,471).

With respect to claim 1, Wagner (figure 1) discloses a fiberoptic wavelength combiner comprising a collimating lens (12) having a first surface (16) and a second surface (18), opposite the first surface (16); two input optical fibers (22 and 24) secured to the first surface (16), each input optical fiber conducting light at a wavelength that is different from other input optical fibers (λ_1 and λ_2); reflectors (26 and 32) spaced from the second surface, the reflectors having a front surface facing the collimating lens and a rear surface (as shown in figure 1); an output optical fiber (20) secured to the first surface (16), whereby light from the at least two input fibers (22 and 24) is collimated by the lens (12) and made incident on the reflectors (26 and 32) (column 2, lines 9-24) and direct the light back through the collimating lens onto the output optical fiber (20).

However, Zhang et al. (figures 4 and 5 and column 5, line 54- column 6, line 19) disclose a wedge mirror having a front surface (30) provided with a first reflective coating and the rear surface (31) provided with a second reflective coating. Such an element would advantageously provide high reflection to a certain wavelength band and optimize to reflect the wavelength band. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Wagner with the wedge mirror having the front and rear surfaces with the first and second reflective coatings (accordance with the teaching of Zhang et al.). Doing so would be beneficial to obtain the high reflection to a certain wavelength band and optimize to reflect the wavelength band.

With respect to claim 2, Wagner (figure 1) discloses the combiner; wherein light collimated by the lens (12) forms a collimated beam for each input optical fiber (22 and 24).

Wagner does not explicitly disclose each collimated beam exits the lens at an angle within a range of 1° to 3° .

However, the angle of the collimated beam exiting the lens being within the range of 1° to 3° is considered to be obvious, since the fiber spacing is dependent on the choice of beam angles. It would advantageously provide a good arrangement of optical signal transmission elements and low the insertion loss. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle of the collimated beam exiting the lens of Wagner's device within the range as claimed for the purpose of obtaining the better arrangement of the optical signal transmission elements and reduce the insertion loss, and it also has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the ranges claimed. *In re Aller*, 105 USPQ 233 (see MPEP § 2144.05).

With respect to claim 3, Wagner (figure 1) discloses the combiner; wherein light collimated by the lens (12) forms a collimated beam for each input optical fiber (22 and 24).

Wagner does not specifically disclose each collimated beam exits the lens at an angle within a range of 1.8° to 2° .

However, the angle of the collimated beam exiting the lens being within the range of 1.8° to 2° is considered to be obvious, since the fiber spacing is dependent on the choice of beam angles. It would advantageously provide a good arrangement of optical signal transmission elements and low the insertion loss. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle of the collimated beam exiting the lens of Wagner's device within the range as claimed for the purpose of obtaining the better arrangement of the optical signal transmission elements and reduce the insertion loss, and it also has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the ranges claimed. *In re Aller*, 105 USPQ 233 (see MPEP § 2144.05).

With respect to claim 4, Wagner (figure 1) discloses the reflectors (26 and 32) having angles relative to a central optical axis (14) through the lens (12).

Wagner does not explicitly disclose the angle of the reflector, relative to a central optical axis through the lens, that is twice the angle of the exiting collimated beam.

However, the angle of the reflector being twice the angle of the exiting collimated beam is also considered to be obvious, since the fiber spacing is dependent on the selection of beam angles. It would advantageously provide a good arrangement of optical signal transmission elements and low the insertion loss. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle setting, relative to the central axis of the lens, between the reflector and the exiting collimated beam of Wagner's device with the value as claimed for the purpose of obtaining the better arrangement of the optical signal transmission elements and reduce the insertion loss, and it also has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the value claimed. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05).

With respect to claim 5, Wagner (figure 1 and column 2, lines 45-47) discloses the combiner, wherein two input optical fibers (22 and 24) are used with a first input optical fiber (22) conducting light of wavelength λ_1 and a second input optical fiber (24) conducting light of wavelength λ_2 , wherein λ_1 is different than λ_2 .

With respect to claim 6, Wagner (column 2, lines 29-40) discloses wavelength transmission of greater than 80% for whichever band is passed.

Wagner does not explicitly disclose the first reflective coating is at least 99% reflective at wavelength λ_1 and transmits at least 99% at wavelength λ_2 and wherein the second reflective coating is at least 99% reflective at wavelength λ_2 .

However, the first reflective coating being at least 99% reflective at wavelength λ_1 and transmitting at least 99% at wavelength λ_2 and the second reflective coating being at least 99% reflective at wavelength λ_2 are considered to be obvious, since the efficiency of the optical transmission is dependent on how good of the reflective coating to reflect the light beam. Such an element would advantageously provide a highly efficient transmission of optical signal. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflective coating of the reflectors of Wagner's device with the value as claimed to reflect and transmit the light beam for the purpose of obtaining the highly efficient transmission of optical signal, and it also has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the value claimed. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05).

7. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner (as cited above) in view of Zhang et al. (as cited above) and Takahashi (U.S. Patent 6,563,987).

With respect to claim 8, Wagner (figure 1) discloses a method of aligning a fiberoptic wavelength combiner comprising a collimating lens (12) having a first surface

(16) and a second surface (18), opposite the first surface (16); two input optical fibers (22 and 24) secured to the first surface (16), each input optical fiber conducting light at a wavelength that is different from other input optical fibers (λ_1 and λ_2); reflectors (26 and 32) spaced from the second surface, the reflectors having a front surface facing the collimating lens and a rear surface (as shown in figure 1); an output optical fiber (20) secured to the first surface (16), whereby light from the at least two input fibers (22 and 24) is collimated by the lens (12) and made incident on the reflectors (26 and 32) (column 2, lines 9-24) and direct the light back through the collimating lens onto the output optical fiber (20).

Wagner does not explicitly disclose a wedge mirror (as recited in claims 8 and 11) having a front surface provided with a first reflective coating and the rear surface provided with a second reflective coating.

However, Zhang et al. (figures 4 and 5 and column 5, line 54- column 6, line 19) disclose a wedge mirror having a front surface (30) provided with a first reflective coating and the rear surface (31) provided with a second reflective coating. Such an element would advantageously provide high reflection to a certain wavelength band and optimize to reflect the wavelength band. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Wagner with the wedge mirror having the front and rear surfaces with the first and second reflective coatings (accordance with the teaching of Zhang et al.). Doing so would be beneficial to obtain the high reflection to a certain wavelength band and optimize to reflect the wavelength band.

The combination of Wagner and Zhang et al. substantially disclose the invention as claimed.

Neither Wagner nor Zhang et al. disclose a method of aligning a fiberoptic wavelength combiner further comprising adjusting orientation of the mirror and locations of all optical fibers relative to a center of the first surface of the lens before fusing the optical fibers to the first surface of the lens.

However, Takahashi (column 7, lines 10-44) discloses the alignment of the fiberoptic wavelength combiner further comprising adjusting orientation of the mirror and locations of all optical fibers relative to a center of the first surface of the lens before fusing the optical fibers to the first surface of the lens. Such an element would advantageously provide no optical insertion loss (column 8, lines 6-7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of making the device structure of the above combination by adjusting orientation of the mirror and locations of all optical fibers relative to a center of the first surface of the lens before fusing the optical fibers to the first surface of the lens (accordance with the teaching of Takahashi). Doing so would be beneficial to facilitate the manufacture of the optical device with low optical insertion loss and high optical transmission rates.

With respect to claim 9, Wagner (figure 1) discloses the combiner; wherein light collimated by the lens (12) forms a collimated beam for each input optical fiber (22 and 24).

Wagner does not explicitly disclose each collimated beam exits the lens at an angle within a range of 1° to 3° .

However, the angle of the collimated beam exiting the lens being within the range of 1° to 3° is considered to be obvious, since the fiber spacing is dependent on the choice of beam angles. It would advantageously provide a good arrangement of optical signal transmission elements and low the insertion loss. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle of the collimated beam exiting the lens of Wagner's device within the range as claimed for the purpose of obtaining the better arrangement of the optical signal transmission elements and reduce the insertion loss, and it also has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the ranges claimed. *In re Aller*, 105 USPQ 233 (see MPEP § 2144.05).

With respect to claim 10, Wagner (figure 1) discloses the combiner; wherein light collimated by the lens (12) forms a collimated beam for each input optical fiber (22 and 24).

Wagner does not specifically disclose each collimated beam exits the lens at an angle within a range of 1.8° to 2° .

However, the angle of the collimated beam exiting the lens being within the range of 1.8° to 2° is considered to be obvious, since the fiber spacing is dependent on the

choice of beam angles. It would advantageously provide a good arrangement of optical signal transmission elements and low the insertion loss. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle of the collimated beam exiting the lens of Wagner's device within the range as claimed for the purpose of obtaining the better arrangement of the optical signal transmission elements and reduce the insertion loss, and it also has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the ranges claimed. *In re Aller*, 105 USPQ 233 (see MPEP § 2144.05).

With respect to claim 11, Wagner (figure 1) discloses the reflectors (26 and 32) having angles relative to a central optical axis (14) through the lens (12).

Wagner does not explicitly disclose the angle of the reflector, relative to a central optical axis through the lens, that is twice the angle of the exiting collimated beam.

However, the angle of the reflector being twice the angle of the exiting collimated beam is also considered to be obvious, since the fiber spacing is dependent on the selection of beam angles. It would advantageously provide a good arrangement of optical signal transmission elements and low the insertion loss. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle setting, relative to the central axis of the lens, between the reflector and the exiting collimated beam of Wagner's device with the value as claimed for the

purpose of obtaining the better arrangement of the optical signal transmission elements and reduce the insertion loss, and it also has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the value claimed. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05).

With respect to claim 12, Wagner (figure 1 and column 2, lines 45-47) discloses the combiner, wherein two input optical fibers (22 and 24) are used with a first input optical fiber (22) conducting light of wavelength λ_1 and a second input optical fiber (24) conducting light of wavelength λ_2 , wherein λ_1 is different than λ_2 .

With respect to claim 13, Wagner (column 2, lines 29-40) discloses wavelength transmission of greater than 80% for whichever band is passed.

Wagner does not explicitly disclose the first reflective coating is at least 99% reflective at wavelength λ_1 and transmits at least 99% at wavelength λ_2 and wherein the second reflective coating is at least 99% reflective at wavelength λ_2 .

However, the first reflective coating being at least 99% reflective at wavelength λ_1 and transmitting at least 99% at wavelength λ_2 and the second reflective coating being at least 99% reflective at wavelength λ_2 are considered to be obvious, since the efficiency of the optical transmission is dependent on how good of the reflective coating to reflect the light beam. Such an element would advantageously provide a highly efficient transmission of optical signal. Therefore, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to modify the reflective coating of the reflectors of Wagner's device with the value as claimed to reflect and transmit the light beam for the purpose of obtaining the highly efficient transmission of optical signal, and it also has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the value claimed. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05).

Allowable Subject Matter

8. Claims 7 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art fails to disclose or reasonably suggest the combiner wherein the output optical fiber is single mode for longer of the two wavelengths λ_1 and λ_2 and is multimode for the shorter of the two wavelengths.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Doan whose telephone number is (571) 272-2346. The examiner can normally be reached on Monday to Thursday from 6:00 am to 3:30 pm, second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer Doan

Patent examiner

October 21, 2004